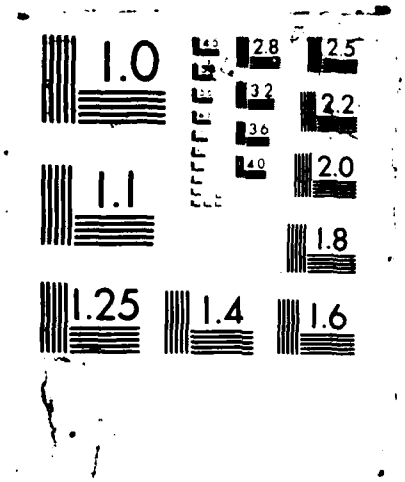
AD-A192 314 AUTOMATIC LINE NETWORK EXTRACTION FROM AERIAL IMAGERY OF URBAN AREAS THRO.. (U) FORSCHUNGSINSTITUT FUER INFORMATIONS- VERARBEITUNG UND MUSTER.. H KAZMIERCZAK

UNCLASSIFIED 20 JAN 87 DAJA45-86-C-0049 F/G 8/2 NL

1/1


1.0
2.8
2.5
3.2
2.2
3.6
4.0
2.0
1.1
1.8
1.25
1.4
1.6

FORSCHUNGSINSTITUT FÜR INFORMATIONSVERARBEITUNG
UND MUSTERERKENNUNG
Forschungsgesellschaft für Angewandte Naturwissenschaften e.V.
Eisenstockstraße 12, D-7505 Ettlingen 6

(2)

AUTOMATIC LINE NETWORK EXTRACTION FROM AERIAL IMAGERY OF URBAN AREAS THROUGH KNOWLEDGE BASED IMAGE ANALYSIS

First Interim Report

20 January 1987

United States Army
EUROPEAN RESEARCH OFFICE OF THE U.S. ARMY
London England

CONTRACT NUMBER DAJA45-86-C-0049

Contractor: Forschungsgesellschaft für Angewandte Naturwissenschaften (FGAN), Wachtberg, Germany
Principal Investigator: Prof. Dr.-Ing. H. Kazmierczak, FIM, Ettlingen, Germany

1. Present Status.

We have started work on the project immediately after having been notified of the final signing of the contract.

The first activities referred to three different topics, namely

- development of a first overall concept,
- selection and digitization of test imagery,
- application of starting point search to test imagery and assessment of performance.

First overall concept: The whole process will consist of the following major processing steps:

+ application of procedures for starting point search of the road network;
+ application of procedures for road extraction from the image by setting out from the starting points;
+ application of procedures for subimage segmentation on the basis of general contrast evaluation;
+ compilation of all resulting objects, object sections, and image segments into a data base for image segments;
+ application of procedures for structure analysis of image segments;
+ compilation of a model of a typical suburban area: objects, features, relations and hierarchies between objects to be stored in a semantic net;
+ comparison of object structures found in the image with model structures to achieve labeling;
+ data dependent iterative improvement and refinement of object structure labeling via prediction and verification,
+ selection of road structures for display and assessment.

Methods for some of these processing steps have already been developed in the context of other projects; performance assessment and adaptation will be necessary as well as the development of a general control mechanism to sequence the different processing steps.

Test imagery. We decided preliminarily to select test imagery of two different levels of complexity:

+ two test images of the area of Phoenix, Ariz., where housing

follows simple rules and, hence, displays very clear structures (low level of complexity),

+ two test images of the area of Bietigheim, Southern Germany, where the urban structures are more complicated (medium level of complexity).

The test images have been digitized using a 50 um or 100 um raster which results in a pixel size of approx. 1.5m to 1.8m on the ground.

Starting point search: Procedures for starting point search have been applied to some of the test images using different parameter values to study and optimize performance. No conclusions can be presented as yet.

2. Continuation of Work.

Work will continue with application of procedures for line extraction and image segmentation, where no difficulies are anticipated. The next critical topic will be the compilation of a suitable image segment data base.

END

DATE

FILMED

6-1988

DTIC